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CLAIMS

What is claimed is:

1. A source having an impedance and connected to a load, the source comprising:

a detection circuit to determine whether a current flow through the impedance is load-induced or source-induced; and

a processing circuit to perform an operation based upon whether the current flow is load-induced or source-induced.

2. The source as claimed in claim 1, wherein the detection circuit determines polarities of the current flow and an output voltage across the load, and determines the current flow to be source-induced or load-induced based upon the polarities of the current flow and the output voltage.

3. The source as claimed in claim 1, wherein the detection circuit determines polarities of the current flow and an output voltage across the impedance, and determines the current flow to be source-induced if the polarities are the same and load-induced if the polarities are opposite to each other.

4. The source as claimed in claim 1, further comprising:

a voltage source to generate an output voltage;

a DC offset elimination circuit, which is a DC servo control loop connected to the voltage source, to eliminate DC offset voltages of the output voltage; and

an output impedance circuit, which is a feedback loop connected to the voltage source, to generate an output impedance for the source and which operates simultaneously with the DC offset elimination circuits;

wherein the detection circuit is connected between the DC offset elimination circuit and the output impedance circuit, determines whether the current flow is load-induced or source induced, and the processing circuit eliminates the current flow which is source-induced.

5. The source as claimed in claim 1, wherein the source is an active harmonic filter that selectively opposes currents generated by local harmonic sources while not generating signals to oppose currents caused by harmonic voltage sources located elsewhere in a system.

6. The source as claimed in claim 1, wherein the source, the DC offset elimination circuit, and the output impedance circuits are not included and the remainder of the system is a measuring instrument further comprising an output indicator which indicates whether the current flow is source-induced or load-induced.

7. A power source circuit comprising:

a voltage source to generate an output voltage;

a DC offset elimination circuit, which is a DC servo control loop connected to the voltage source, to eliminate DC offset voltages of the output voltage; and

an output impedance circuit, which is a feedback loop connected to the voltage source, to generate an output impedance for the source and which operates simultaneously with the DC offset elimination circuits; and

a detection circuit, connected between the DC offset elimination circuit and the output impedance circuit, which determines whether a current flow through the output impedance is load- induced or source induced, and eliminates the current flow which is source-induced.

8. The power source circuit as claimed in claim 7, wherein the detection circuit comprises a resistor connected between the DC offset elimination circuit and the output impedance circuit, and the output impedance has a resistive component.

9. The power source circuit as claimed in claim 7, wherein the detection circuit comprises a capacitor connected between the DC offset elimination circuit and the output impedance circuit, and the output impedance has an inductive component.

10. The power source circuit as claimed in claim 7, wherein the detection circuit comprises:

a resistor; and

a capacitor;

wherein the output impedance has resistive and inductive components.

11. The power source circuit as claimed in claim 7, further comprising:

a gain varying circuit which adjusts magnitudes of resistive and inductive components of the output impedance circuit.

12. The power source circuit as claimed in claim 11, wherein the gain varying circuit comprises:

a first multiplying D/A which varies a gain for the resistive component of the output impedance circuit; and

a second multiplying D/A which adjusts a gain of the inductive component of the output impedance circuit.

13. The power source circuit as claimed in claim 7, wherein:

the voltage source comprises:

an inverting amplifier which inverts and amplifies an input voltage,

a differential gain block to provide a voltage proportional to the output voltage of the source which proportional voltage is used as a negative feedback signal to control the source output voltage,

a current sensing element to sense a current output from the inverting amplifier, and

a differential gain block to provide a voltage proportional to the current passing through the current sensing element;

wherein the detection circuit is connected to an output end of the current sensing differential gain block.

14. The power source circuit as claimed in claim 13, wherein:

the DC offset circuit comprises:

a differential integrator from which a correcting signal to eliminate undesired DC and low frequency AC signals is fed back to the summing junction of the inverting amplifier;

wherein the detection circuit is connected to the differential integrator.

15. The power source circuit as claimed in claim 14, further comprising a resistor connected between the differential integrator and the summing junction of the inverting amplifier.

16. The power source circuit as claimed in claim 13, wherein the output impedance circuit comprises:

at least one resistive element and one inductive element (capacitor), in parallel, and connected at a first end to the summing junction of the inverting amplifier and at a second end to the detection circuit and the voltage output of the current sensing differential gain block.

17. The power source circuit as claimed in claim 14, wherein the output impedance circuit comprises:

a first resistive element and a first inductive element (capacitor), in parallel, and connected at a first end to the summing junction of the inverting amplifier and at a second end to the detection circuit and the voltage output of the current sensing differential gain block.

18. The power source circuit as claimed in claim 17, wherein the detection circuit comprises:

a second resistive element and a second inductive element (capacitor), in parallel, wherein first ends of the second resistive and inductive elements (capacitor) are each connected to the differential integrator and second ends of the second resistive and inductive elements (capacitor) are respectively connected to the first resistive and inductive elements (capacitor) of the output impedance circuit.

19. A method of controlling operations of a source which is connected to a load, the method comprising:

determining whether a current flow through an impedance of the source is load-induced or source-induced; and

controlling one of the operations based upon the whether the current flow is load-induced or source-induced.

20. The method as claimed in claim 19, wherein the determining comprises:

determining polarities of the current flow and an output voltage across the impedance; and

determining the current flow to be source-induced or load-induced based upon the polarities of the current flow and the output voltage.

21. The method as claimed in claim 20, wherein the determining comprises:

determining polarities of the current flow and an output voltage across the impedance; and

determining the current flow to be source-induced if the polarities are the same and load-induced if the polarities are opposite to each other.

22. A method of controlling a power source circuit, the method comprising:

generating an output voltage;

forming a first loop which eliminates DC offset voltages of the output voltage;

forming a second loop to generate an output impedance for the power source circuit simultaneously with the eliminating of the DC offset voltages; and

determining whether a current flow through the output impedance is load-induced or source induced, and eliminating the current flow which is source-induced.

23. The method as claimed in claim 22, wherein the determining of whether the current flow through the output impedance is load-induced or source-induced comprises:

determining polarities of the current flow and an output voltage across the impedance; and

determining the current flow to be source-induced if the polarities are the same and load-induced if the polarities are opposite to each other.